

# THE ANNALS

AND

## MAGAZINE OF NATURAL HISTORY.

[SIXTH SERIES.]

No. 80. AUGUST 1894.

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XIV.—*On the Herpetological Fauna of Palawan and Balabac.*  
By G. A. BOULENGER, F.R.S.

IN his valuable paper, "On the Zoo-geographical Relationships of the Island of Palawan and some adjacent Islands"\*, Mr. A. Everett has shown that Palawan, together with other islands west of Mindoro Straits, should be regarded as forming part of that district of the Indo-Malayan subregion to which Borneo belongs, as its fauna has much more in common with that of the latter island than with the Philippines proper. His conclusions were derived from a study of the mammals and birds. Of the reptiles and batrachians very little was known at that time. A new snake from Palawan (*Callophis bilineatus*) had been described by Peters in 1881, a new toad by myself in 1887 (*Bufo philippinensis*), and a widely distributed Agamoid lizard (*Calotes cristatellus*) had been recorded in the British Museum 'Catalogue of Lizards.' A list of eight species has since been contributed by Dr. Mocquard (Nouv. Arch. du Muséum [3] ii: 1890). Thanks to an important collection made for the British Museum by Mr. Everett himself on Palawan and Balabac, we are now able to draw up the following list of the species of reptiles and batrachians represented on these islands. Mr. Everett's conclusions are entirely confirmed so far as these classes of animals are concerned.

\* Proc. Zool. Soc. 1889, p. 220, with map.

## REPTILIA.

## CHELONIA.

1. *Cyclemys dhor*, Gray.

Palawan, Balabac.

Known from the Malay Peninsula, Sumatra, Borneo, and Java.

## LACERTILIA.

2. *Hemidactylus platyurus*, Schneid.

Balabac.

From Southern China and the Himalayas to Java, Celebes, and the Philippines.

3. *Gecko verticillatus*, Laur.

Palawan, Balabac.

From Southern China and Bengal to the Philippines, the Moluccas, and Timor-Laut.

4. *Gecko monarchus*, D. & B.

Recorded from Palawan by Mocquard.

Malay Peninsula, Sumatra, Borneo, Philippines, Java, Celebes, Moluccas.

5. *Draco volans*, L.

Palawan.

Malay Peninsula, Sumatra, Borneo, Java.

6. *Calotes cristatellus*, Kuhl.

Palawan, Balabac.

Malay Peninsula, Sumatra, Borneo, Philippines, Java, Celebes, Moluccas, Timor, Timor-Laut.

7. *Varanus salvator*, Laur.

Palawan.

From China and Nepal to Cape York.

8. *Mabuia multifasciata*, Kuhl.

Balabac.

From Sikkim and Burma to the Philippines, the Moluccas, and Timor-Laut.

## OPHIDIA.

9. *Polyodontophis bivittatus*, sp. n.

Palawan. Two male specimens.

Rostral twice as broad as deep, just visible from above; internasals shorter than the præfrontals; frontal once and two thirds as long as broad, longer than its distance from the end of the snout, shorter than the parietals; loreal as deep as long; one præocular; two postoculars, both in contact with the parietal; temporals 2+2, the lower anterior wedged in between the sixth and seventh labials; eight upper labials, third, fourth, and fifth entering the eye; four lower labials in contact with the anterior chin-shields, which are as long as the posterior. Scales in 17 rows. Ventrals 153-155; anal divided; subcaudals—? (tail mutilated). Black above, with two white streaks commencing on the parietal shields and running along the sixth series of scales and the adjoining halves; a white cross bar on the forehead, occupying the anterior two thirds of the frontal and supraocular shields; a series of white spots along the upper lip; lower parts white, with a black dot or spot at the outer end of each shield.

Total length 490 millim.

In the coloration of its upper parts this snake shows a remarkable similarity to *Adenophis bilineatus*, which inhabits the same island.

10. *Tropidonotus spilogaster*, Boie.

Palawan.

Only known from the Philippines.

11. *Tropidonotus chrysargus*, Schleg.

Palawan, Balabac.

From the Eastern Himalayas and Southern China to Sumatra, Borneo, and Java.

12. *Coluber erythrurus*, D. & B.

Palawan.

Philippines, Sooloo Islands, Celebes.

13. *Coluber oxycephalus*, Boie.

Balabac.

Eastern Himalayas, Malay Peninsula, Sumatra, Borneo, Philippines, Java, Celebes.

14. *Dendrophis pictus*, Gm.

Balabac.

From the Eastern Himalayas and Bengal to the Philippines and Moluccas.

15. *Dendrelaphis caudolineatus*, Gray.

Palawan, Balabac.

Southern India, Malay Peninsula, Sumatra, Borneo.

16. *Calamaria Everetti*, Blgr.

Palawan.

Two specimens are referred to this species, recently described (Proc. Zool. Soc. 1893, p. 525) from Sarawak. They differ, however, from the type in the coloration. The dark nuchal blotch and yellow collar are absent, and in one of the specimens a series of black dots runs along the middle of the belly. Ventrals 184 and 175; subcaudals 16 and 18.

17. *Dipsas dendrophila*, Schleg.

Palawan.

Malay Peninsula, Sumatra, Borneo, Philippines, Java, Celebes.

18. *Psammodynastes pulverulentus*, Boie.

Palawan, Balabac.

From the Eastern Himalayas to the Philippines and Timor.

19. *Cerberus rhynchops*, Schneid.

Palawan.

From India and Ceylon to New Guinea and the north coast of Australia. Enters salt water.

20. *Naia tripudians*, Merr.

Palawan.

From Transcaspia and Southern China to Sumatra, Borneo, the Philippines, and Java.

The young specimen obtained on Palawan by Mr. Everett is black, with 11 whitish annuli, the first interrupted on the nape and confluent with the white of the throat and upper lip. 23 scales across the neck, 19 across the middle of the body. Ventrals 185; subcaudals 47, second and third entire.

This form is intermediate between the true *N. tripudians* and *N. sputatrix*.

21. *Adeniophis bilineatus*.

*Callophis bilineatus*, Peters, Sitz. Ges. naturf. Fr. Berlin, 1881, p. 109.

Palawan, Balabac.

The following diagnosis is taken from two specimens obtained by Mr. Everett, a female from Puerto Princesa and a male from Balabac:—

Frontal as long as its distance from the rostral, considerably shorter than the parietals; one præ- and two postoculars; temporals 1 + 2; six upper labials, third and fourth entering the eye; chin-shields two pairs, subequal, the anterior in contact with four labials. Scales in 13 rows. Ventrals 245 (♂) and 268 (♀); anal entire; subcaudals 29 (♂) and 25 (♀). Black above, with two white streaks along the body, commencing on the parietal shields, and running along the fourth and fifth series of scales; outer row of scales white, with a black longitudinal streak or a series of black dots; upper lip and a blotch across the præfrontal shields white; belly with black cross bars, each involving two or three ventral shields and separated from each other by two to four white shields; tail orange or pink, with two or three black blotches or rings.

Total length 710 millim., tail 45.

22. *Amblycephalus boa*, Boie.

Palawan, Balabac.

Malay Peninsula, Borneo, Philippines, Java, Moluccas.

23. *Trimeresurus formosus*, Schleg.

Palawan.

Sumatra, Borneo.

24. *Trimeresurus subannulatus*, Gray.

Palawan.

Sumatra, Borneo, Philippines, Celebes.

BATRACHIA.

E C A U D A T A.

1. *Oxyglossus lævis*, Gthr.

Balabac.

Burma, Malay Peninsula, Sumatra, Philippines.

2. *Rana macrodon*, D. & B.

Palawan, Balabac.

Burma, Malay Peninsula, Sumatra, Borneo, Philippines, Java.

3. *Rana palawanensis*, sp. n.

Palawan. Three female specimens.

Allied to *R. modesta*, Blgr., *Doriae*, Blgr., *Limborgii*, W. Sclater, and *Hascheana*, Stol. Vomerine teeth in two

oblique oval groups, commencing on a line with the hinder edge of the choanæ. Head moderate, as long as broad; snout short, rounded, as long as the diameter of the orbit; canthus rostralis angular; loreal region slightly concave; nostril equidistant from the orbit and the end of the snout; interorbital space as broad as the upper eyelid; tympanum distinct, three fifths the diameter of the eye. Fingers moderate, the tips dilated into small disks; first finger extending slightly beyond second; toes moderate, two-thirds webbed, the tips dilated into small but very distinct disks; subarticular tubercles moderate; inner metatarsal tubercle elliptic, blunt, two fifths the length of the inner toe; no outer metatarsal tubercle; no tarsal fold. Tibio-tarsal articulation reaching beyond the tip of the snout; tibia as long as the fore limb. Skin nearly smooth; posterior half of upper eyelids warty; a narrow glandular dorso-lateral fold; a fold from the eye to the shoulder. Brown above; sides of snout below the canthi blackish; temporal region light; a dark cross bar between the eyes; a  $\wedge$ -shaped blackish inter-scapular marking; dorso-lateral folds edged with blackish on the outer side; limbs with regular dark cross bands; lower parts whitish.

From snout to vent 43 millim.

#### 4. *Rana varians*, sp. n.

Palawan. Several specimens.

Closely allied to *R. temporalis*, Gthr. Vomerine teeth in two oblique series extending beyond the level of the hinder edge of the choanæ. Head depressed, longer than broad; snout obtusely or acutely pointed, prominent, longer than the diameter of the orbit; canthus rostralis angular; loreal region nearly vertical, strongly concave; nostril nearer the tip of the snout than the eye; interorbital space as broad as the upper eyelid or a little narrower; tympanum very distinct, as large as the eye or a little smaller. Fingers moderate, first extending beyond second; toes nearly entirely webbed; tips of fingers and toes dilated into well-developed disks; subarticular tubercles well developed; inner metatarsal tubercle oval, blunt; a small round outer metatarsal tubercle; no tarsal fold. Tibio-tarsal articulation reaching beyond the tip of the snout; tibia as long as the fore limb. Skin finely granulate, with or without scattered small warts; a narrow glandular dorso-lateral fold. Brown, pink, or dark grey above; a black streak below the canthus rostralis and a black temporal blotch; limbs with dark cross bands; hinder side of thighs marbled with brown; some specimens with a

pale line along the vertebral line and another along the upper surface of the tibia. Male with internal vocal sacs and without humeral gland.

From snout to vent, ♂ 43 millim., ♀ 70.

5. *Rana glandulosa*, Blgr.

Palawan.

Malay Peninsula, Borneo.

6. *Staurois natator*, Gthr.

Palawan.

Numerous specimens of this species first described from the Philippines, and since recorded from Palawan under the name of *Ixalus nubilus* by Mocquard. All lack the vomerine teeth. All Bornean specimens of *Rana guttata*, Gthr., have more or less distinct vomerine teeth. I have recently examined a number of specimens from Kina Baloo, and it is therefore probable that the curious larvæ described by Mocquard should be referred to that species, and not to *Ixalus nubilus* = *Staurois natator*.

7. *Rhacophorus leucomystax*, Gravh.

Recorded from Palawan by Mocquard.

From the Himalayas and Southern China to the Philippines, Borneo, Sumatra, Java, and Celebes.

8. *Rhacophorus macrotis*, Blgr.

Palawan, Balabac.

Recently described (Ann. & Mag. Nat. Hist. [6] vii. 1890, p. 282) from Baram, Borneo.

9. *Rhacophorus Everetti*, sp. n.

Palawan. Two specimens.

Vomerine teeth in two oblique groups between the moderately large choanæ. Head slightly broader than long, without dermal ossification. Snout rounded, shorter than the diameter of the orbit; canthus rostralis obtuse, curved; loreal region concave, very oblique; nostrils near the end of the snout; interorbital space as broad as the upper eyelid; tympanum distinct, two fifths the diameter of the eye. Fingers with a slight rudiment of web; disks moderate, nearly as large as the tympanum; toes three-fourths webbed; inner metatarsal tubercle very small; no tarsal fold. Tibio-tarsal articulation reaching a little beyond the tip of the snout. Skin finely granulate above, coarsely beneath; small

conical tubercles below the vent, at the heel, and along the outer edge of the forearm and tarsus. Pale yellowish or reddish brown above, with dark brown markings; the most conspicuous of these are a cross band between the eyes and a symmetrical marking on the præ-sacral part of the back, roughly representing a frog with the four limbs stretched out; limbs with dark cross bands; lower parts uniform white.

From snout to vent 32 millim.

10. *Ixalus longicrus*, sp. n.

Palawan. Three specimens.

Closely allied to *I. Schmackeri*, Bttgr., from Mindoro. Snout pointed, as long as the diameter of the orbit; canthus rostralis angular; loreal region concave; nostril nearer the end of the snout than the eye; interorbital space broader than the upper eyelid; tympanum distinct, about two fifths the diameter of the eye. Fingers free, disks a little smaller than the tympanum; toes half-webbed. Tibio-tarsal articulation reaching far beyond the tip of the snout; femoro-tibial articulation reaching the shoulder. Above rough with small warts; two oblique glandular ridges, converging behind, between the shoulder; throat smooth; belly and lower surface of thighs granulate. Grey above, with a large X-shaped dark marking or a pair of )(-shaped bands on the back, a dark cross band or triangular blotch between the eyes, and regular cross bands on the limbs; a black light-edged spot on the knee; a streak below the canthus rostralis, a bar below the eye, and the whole temporal region blackish; dirty white beneath, throat finely speckled with brown; a series of small round white spots on the lower lip. Male with internal vocal sacs.

From snout to vent 21 millim.

11. *Bufo philippinicus*, Blgr.

Palawan, Balabac.

This species was described in 1887 (Ann. & Mag. Nat. Hist. [5] xix. p. 348, pl. x. fig. 5) from a single female specimen obtained by Mr. Everett at Puerto Princesa. Numerous specimens have now been collected. I suspect that the Palawan toad recorded by Mocquard under the name of *Bufo divergens*, Peters, belongs to this species, which is in some respects intermediate between the latter and *B. biporcatus*, but differs from both in its thicker cranial ridges and larger parotoids. In some specimens the frontal and parietal ridges form nearly a straight line, as in *B. biporcatus*,





	1.	2.	3.	4.	5.	6.	7.	8.	9.
<i>Cerberus rhynchops</i> . . . . .	*	*	*	*	*	*	*	*	*
<i>Naia tripudians</i> . . . . .	*	*	*	*	*	*	..	*	
<i>Adeniophis bilineatus</i> . . . . .	..	..	..	..	*				
<i>Amblycephalus boa</i> . . . . .	..	*	..	*	*	*	*	..	*
<i>Trimeresurus formosus</i> . . . . .	..	..	*	*	*				
— <i>subannulatus</i> . . . . .	..	..	*	*	*	*	..	*	
<i>Oxyglossus lævis</i> . . . . .	*	*	*	..	*	*			
<i>Rana macrodon</i> . . . . .	*	*	*	*	*	*	*		
— <i>palavanensis</i> . . . . .	..	..	..	..	*				
— <i>varians</i> . . . . .	..	..	..	..	*				
— <i>glandulosa</i> . . . . .	..	*	..	*	*				
<i>Staurois natator</i> . . . . .	..	..	..	..	*	*			
<i>Rhacophorus leucomystax</i>	*	*	*	*	*	*	*	*	
— <i>macrotis</i> . . . . .	..	..	..	*	*				
— <i>Everetti</i> . . . . .	..	..	..	..	*				
<i>Ixalus longicrus</i> . . . . .	..	..	..	..	*				
<i>Bufo philippinicus</i> . . . . .	..	..	..	..	*				
<i>Leptobrachium Hasseltii</i> ..	*	*	*	*	*	..	*		
<i>Megalophrys montana</i> . . . .	..	..	*	*	*	*	*		

XV.—*Descriptions of Fifteen new Species of South-African Terrestrial Mollusca.* By JAMES COSMO MELVILL, M.A., F.L.S., and JOHN HENRY PONSONBY, F.Z.S.

[Plate I.]

Since our last communication \* a fair amount of additional material has been kindly forwarded by various correspondents, and one or two more species from the rich stores of Mr. E. L. Layard.

1. *Nanina morrumbalensis*, sp. n. (Pl. I. fig. 1.)

*N.* testa olivaceo-cornea, pertenui, planulata, obtecte et angustissime umbilicata, parum nitente; anfractibus quinque, undique irregulariter longitudinaliter rugoso-striatis, ultimo rapide accrescente, spira conico-depressa; apertura ampla, ovato-lunari; peristomate pertenui, simplici, apud umbilicum paulum reflexo. Long. .75, lat. 1.30 unc.

*Hab.* Mount Morrumbala, Central East Africa (*E. L. Layard*).

A large, somewhat transparent, horny shell, but little shining, throughout longitudinally striately wrinkled, the

\* *Ann. & Mag. Nat. Hist.* ser. 6, vol. xii. pp. 103 *et* *sqq.*